WHAT IS CLAIMED IS:

1. A coupled inductor regulator for converting energy from a source of input voltage to an output having an output voltage, comprising:

at least two conduction switches to conduct energy from the source of input voltage to the output;

at least two inductors in communication with the at least two conduction switches, the at least two inductors wound together on a common core and each inductor having a polarity such that DC currents in the inductors cancel each other, the inductors having a coefficient of coupling approximately equal to one;

at least two freewheeling switches in communication with the at least two conduction switches to provide a path for current during non-conduction periods; and

a drive signal generator to generate drive signals each having a duty cycle of approximately 50%, the drive signals to control the at least two conduction switches.

2. The coupled inductor regulator of Claim 1 wherein the coefficient of coupling is approximately at least 0.99.

3. The coupled inductor regulator of Claim 1 wherein the at least two conduction switches, the at least two inductors, and the at least two freewheeling switches are connected in a buck configuration such that the output voltage is approximately one-half the amplitude of the input voltage.

4. The coupled inductor regulator of Claim 3 wherein the buck configuration includes two buck regulators each operating at approximately 50% duty cycle, each buck regulator including;

a conduction switch in communication with a freewheeling switch and an inductor, the conduction switch to communicate current during a conduction period from the source of input voltage through the inductor to the output, the freewheeling switch to provide a conduction path during the non-conduction period for current flowing through the inductor to the output.

5. The coupled inductor regulator of Claim 1 wherein the at least two conduction switches, the at least two inductors, and the at least two freewheeling switches are connected in a boost configuration such that the output voltage is approximately twice the amplitude of the input voltage.

6. The coupled inductor regulator of Claim 5 wherein the boost configuration includes two boost regulators each operating at approximately 50% duty cycle, each boost regulator including;

a conduction switch in communication with a freewheeling switch and an inductor, the conduction switch to communicate current during a conduction period from the a high side of the source of input voltage through the inductor to a low side of the source of input voltage, the freewheeling switch to provide a conduction path during the non-conduction period for current flowing from the high side of the source of input voltage through the inductor to the output.

7. The coupled inductor regulator of Claim 1 wherein the at least two conduction switches, the at least two inductors, and the at least two freewheeling switches are connected in a 1:-1 configuration such that the output voltage is approximately a negative of the input voltage.

8. The coupled inductor regulator of Claim 7 wherein the 1:-1 configuration includes two flyback regulators each operating at approximately 50% duty cycle, each flyback regulator including;

a conduction switch in communication with a freewheeling switch and an inductor, the conduction switch to communicate current during a conduction period from the a high side of the source of input voltage through the inductor to a low side of the source of input voltage, the freewheeling switch to provide a conduction path during the non-conduction period for current flowing from the output through the inductor to the low side of the source of input voltage.

9. The coupled inductor regulator of Claim 1 wherein at least one of the conduction switches includes independently controllable parallel switches.

10. The coupled inductor regulator of Claim 1 wherein the output voltage supplies power to a load; and

further comprising a frequency generator to generate a clock signal having an operating frequency, the drive signals synchronous to the clock signal, and the operating frequency controllable in response to changes in the load.

11. The coupled inductor regulator of Claim 10 wherein the changes in the load include output current changes and output voltage changes.

12. The coupled inductor regulator of Claim 1 wherein each of the at least two inductors includes a pair of series inductors, each pair having a common node between the series inductors; and

each of the conduction switches in communication with the common node of a corresponding pair of series inductors.

13. The coupled inductor regulator of Claim 12 wherein the at least two conduction switches, pairs of series inductors, and freewheeling switches are connected in a buck configuration, the buck configuration including two buck regulators each operating at approximately 50% duty cycle, each buck regulator including;

a conduction switch in communication with a freewheeling switch and the pair of series inductors, the conduction switch to communicate current during a conduction period from the source of input voltage through the pair of series inductors to the output, the freewheeling switch to provide a conduction path during the non-conduction period for current flowing through one of the series inductors to the output.

14. The coupled inductor regulator of Claim 12 wherein the at least two conduction switches, the at least two inductors, and the at least two freewheeling switches are

connected in a boost configuration including two boost regulators each operating at approximately 50% duty cycle, each boost regulator including;

a conduction switch in communication with a freewheeling switch and an inductor, the conduction switch to communicate current during a conduction period from the a high side of the source of input voltage through the inductor to a low side of the source of input voltage, the freewheeling switch to provide a conduction path during the non-conduction period for current flowing from the high side of the source of input voltage through the inductor to the output.

15. The coupled inductor regulator of Claim 12 wherein the at least two conduction switches, the at least two inductors, and the at least two freewheeling switches are connected in a flyback configuration including two flyback regulators each operating at approximately 50% duty cycle, each flyback regulator including;

a conduction switch in communication with a freewheeling switch and an inductor, the conduction switch to communicate current during a conduction period from the a high side of the source of input voltage through the inductor to a low side of the source of input voltage, the freewheeling switch to provide a conduction path during the non-conduction period for

current flowing from the output through the inductor to the low side of the source of input voltage.

16. The coupled inductor regulator of Claim 12 wherein each of the at least two inductors has a quantity of turns, and a turns ratio of the turns for each pair of series inductors is selected to set a voltage ratio of the output voltage divided by the input voltage.

17. The coupled inductor regulator of Claim 16 wherein the at least two inductors each have approximately an equal quantity of turns such that the output voltage is approximately equal to one-fourth of the input voltage; and

wherein the at least two conduction switches, pairs of two series inductors, and the at least two freewheeling switches are connected in a buck configuration, the buck configuration including two buck regulators each operating at approximately 50% duty cycle, each buck regulator including;

a conduction switch in communication with a freewheeling switch and a pair of series inductors, the conduction switch to communicate current during a conduction period from the source of input voltage through the pair of series inductor to the output, the freewheeling switch to provide a conduction

path during the non-conduction period for current flowing through one of the series inductors to the output.

18. The coupled inductor regulator of Claim 16 wherein the series inductors include a first inductor in communication with one of the conduction switches and a second inductor in communication with the output;

the turns ratio of the series inductors is defined as a quantity of turns of the first inductor divided by a quantity of turns of the second inductor; and

wherein the turns ratio of the series inductors is approximately equal to one-half such that the voltage ratio is approximately one-third.

19. The coupled inductor regulator of Claim 1 wherein the freewheeling switches include synchronous rectifiers.

20. The coupled inductor regulator of Claim 1 wherein the drive signals include multi-level switching to reduce switching losses.

21. The coupled inductor regulator of Claim 1 included in a power system, the power system including a low dropout

regulator having a first output, the first output being the input voltage to the coupled inductor regulator; and

a feedback signal connected from the output voltage of the coupled inductor regulator to the low dropout regulator, the low dropout regulator to regulate the first output in response to the feedback signal.

22. The coupled inductor regulator of Claim 1 wherein the common core is made from a high permeability material.

23. The coupled inductor regulator of Claim 22 wherein the common core is made from a ferrite.

24. A regulator system for converting energy from a source of input voltage to an output having an output voltage, comprising:

a low dropout regulator to generate an intermediate voltage from the input voltage;

a coupled inductor regulator to generate the output voltage from the intermediate voltage; and

the low dropout regulator, responsive to a feedback signal from the output voltage, to regulate the intermediate voltage such that the output voltage is regulated at a predetermined level.

25. The regulator system of Claim 24 wherein the low dropout regulator includes a reference amplifier to compare the feedback signal to a reference voltage; and

a Field Effect Transistor (FET), responsive to the reference amplifier, to regulate the intermediate voltage.

26. The regulator system of Claim 24 fabricated on a single integrated circuit.

27. The regulator system of Claim 24 further comprising a multi-loop control system having at least another feedback signal from the intermediate voltage to the low dropout regulator.

28. The regulator system of Claim 27 wherein the multi-loop control system includes a circuit to weight the feedback signals from the output voltage and the intermediate voltage to control the output voltage.

29. The regulator system of Claim 27 wherein the multi-loop control system includes a circuit to select one of the feedback signals from the output voltage and the intermediate voltage to control the output voltage.

30. The regulator system of Claim 27 wherein the multi-loop control system includes a slow inner loop to control the intermediate voltage and a fast outer loop to control the output voltage.

31. The regulator system of Claim 24 wherein the coupled inductor regulator comprises;

at least two conduction switches to conduct energy from the source of input voltage to the output;

at least two inductors in communication with the at least two conduction switches, the at least two inductors wound together on a common core and each inductor having a polarity such that DC currents in the inductors cancel each other, the inductors having a coefficient of coupling approximately equal to one;

at least two freewheeling switches in communication with the at least two conduction switches to provide a path for current during non-conduction periods; and

a drive signal generator to generate drive signals each having a duty cycle of approximately 50%, the drive signals to control the at least two conduction switches.

32. The regulator system of Claim 31 wherein the at least two conduction switches, the at least two inductors, and the at least two freewheeling switches are connected in a buck configuration such that the output voltage is approximately one-half the amplitude of the input voltage.

33. The regulator system of Claim 32 wherein the buck configuration includes two buck regulators each operating at approximately 50% duty cycle, each buck regulator including;

a conduction switch in communication with a freewheeling switch and an inductor, the conduction switch to communicate current during a conduction period from the source of input voltage through the inductor to the output, the freewheeling switch to provide a conduction path during the non-conduction period for current flowing through the inductor to the output.

34. A multistage regulator system to convert energy from a source of input voltage to an output having an output voltage, comprising:

a first coupled inductor regulator to generate an intermediate voltage from the input voltage, the first coupled inductor regulator having a first feature size;

a second coupled inductor regulator to generate the output voltage from the intermediate voltage, the second coupled inductor regulator having a second feature size; and

the first feature size not equal to the second feature size.

35. The multistage regulator system of Claim 34 wherein each of the first and second coupled inductor regulators is arranged in a buck configuration.

36. The multistage regulator system of Claim 35 wherein the first feature size is greater than the second feature size.

37. The multistage regulator system of Claim 35 wherein the first feature size is approximately equal to the second feature size.

38. The multistage regulator system of Claim 34 wherein each of the first and second coupled inductor regulators comprises;

at least two conduction switches to conduct energy from the source of input voltage to the output;

at least two inductors in communication with the at least two conduction switches, the at least two inductors wound together on a common core and each inductor having a polarity such that DC currents in the inductors cancel each other, the inductors having a coefficient of coupling approximately equal to one;

at least two freewheeling switches in communication with the at least two conduction switches to provide a path for current during non-conduction periods; and

a drive signal generator to generate drive signals each having a duty cycle of approximately 50%, the drive signals to control the at least two conduction switches.

39. The multistage regulator system of Claim 38 wherein each of the first and second coupled inductor regulators are connected in a buck configuration such that the output voltage of each of the coupled inductor regulators is approximately one-half the amplitude of the input voltage of the corresponding one of the coupled inductor regulators; and

wherein the buck configuration for each of the coupled inductor regulators includes two buck regulators each operating at approximately 50% duty cycle, each buck regulator including;

a conduction switch in communication with a freewheeling switch and an inductor, the conduction switch to communicate current during a conduction period from the source of input voltage through the inductor to the output, the freewheeling switch to provide a conduction path during the non-conduction period for current flowing through the inductor to the output.

40. A regulator system to convert energy from a source of input voltage to an output having an output voltage, comprising:

a buck converter to generate an intermediate voltage from the input voltage;

a first coupled inductor regulator to generate the output voltage from the intermediate voltage;

a feedback signal to sense the output voltage of the first coupled inductor regulator; and

the buck converter, responsive to the feedback signal, to control the intermediate voltage such that the output voltage of the first coupled inductor regulator is regulated.

41. The regulator system of Claim 40 fabricated on a single integrated circuit.

42. The regulator system of Claim 40 further comprising a multi-loop control system having at least another feedback signal from the intermediate voltage to the buck converter.

43. The regulator system of Claim 42 wherein the multi-loop control system includes a circuit to weight the feedback signals from the output voltage and the intermediate voltage to control the output voltage.

44. The regulator system of Claim 42 wherein the multi-loop control system includes a circuit to select one of the feedback signals from the output voltage and the intermediate voltage to control the output voltage.

45. The regulator system of Claim 42 wherein the multi-loop control system includes a slow inner loop to control the intermediate voltage and a fast outer loop to control the output voltage.

46. The regulator system of Claim 40 wherein the first coupled inductor regulator comprises;

at least two conduction switches to conduct energy from the source of input voltage to the output;

at least two inductors in communication with the at least two conduction switches, the at least two inductors wound together on a common core and each inductor having a polarity such that DC currents in the inductors cancel each other, the inductors having a coefficient of coupling approximately equal to one;

at least two freewheeling switches in communication with the at least two conduction switches to provide a path for current during non-conduction periods; and

a drive signal generator to generate drive signals each having a duty cycle of approximately 50%, the drive signals to control the at least two conduction switches.

47. The regulator system of Claim 46 wherein the first coupled inductor regulator is arranged in a buck configuration such that the output voltage is approximately equal to one-half of the intermediate voltage.

48. The regulator system of Claim 47 wherein the buck configuration includes two buck regulators each operating at approximately 50% duty cycle, each buck regulator including;

a conduction switch in communication with a freewheeling switch and an inductor, the conduction switch to communicate current during a conduction period from the source of input

voltage through the inductor to the output, the freewheeling switch to provide a conduction path during the non-conduction period for current flowing through the inductor to the output.

49. The regulator system of Claim 46 further comprising a second coupled inductor regulator connected to the buck converter.

50. The regulator system of Claim 49 wherein the second coupled inductor regulator is connected in series between the buck converter and the first coupled inductor regulator, each of the first and second coupled inductors regulator arranged in a buck configuration such that the output voltage is approximately equal to one-fourth of the intermediate voltage.

51. The regulator system of Claim 49 wherein the second coupled inductor regulator generates a secondary voltage from the intermediate voltage.

52. An amplifier system for generating an amplified signal, comprising:

a power amplifier referenced to ground to generate a single-ended signal from an input signal, the power amplifier to receive power from an input voltage; and

a coupled inductor regulator to generate a second voltage from the input voltage, the second voltage to be combined with the single-ended signal to form the amplified signal having approximately no DC bias.

53. The amplifier system of Claim 52 fabricated on a single integrated circuit.

54. The amplifier system of Claim 52 wherein the coupled inductor regulator comprises;

at least two conduction switches to conduct energy from the source of input voltage to the output;

at least two inductors in communication with the at least two conduction switches, the at least two inductors wound together on a common core and each inductor having a polarity such that DC currents in the inductors cancel each other, the inductors having a coefficient of coupling approximately equal to one;

at least two freewheeling switches in communication with the at least two conduction switches to provide a path for current during non-conduction periods; and

a drive signal generator to generate drive signals each having a duty cycle of approximately 50%, the drive signals to control the at least two conduction switches; and

wherein the coupled inductor regulator is arranged in a buck configuration such that the second voltage is approximately equal to one-half of the input voltage;

wherein the buck configuration includes two buck regulators each operating at approximately 50% duty cycle, each buck regulator including;

a conduction switch in communication with a freewheeling switch and an inductor, the conduction switch to communicate current during a conduction period from the source of input voltage through the inductor to the output, the freewheeling switch to provide a conduction path during the non-conduction period for current flowing through the inductor to the output.

55. An amplifier system for generating an amplified signal, comprising:

a power amplifier to generate the amplified signal from an input signal, the power amplifier to receive power from an input voltage; and

a coupled inductor regulator to generate a second voltage from the input voltage, the second voltage being a negative of the input voltage and in communication with the power amplifier as a second power source so that DC bias in the amplified signal is reduced.

56. The amplifier system of Claim 55 fabricated on a single integrated circuit.

57. The amplifier system of Claim 55 wherein the coupled inductor regulator comprises;

at least two conduction switches to conduct energy from the source of input voltage to the output;

at least two inductors in communication with the at least two conduction switches, the at least two inductors wound together on a common core and each inductor having a polarity such that DC currents in the inductors cancel each other, the inductors having a coefficient of coupling approximately equal to one;

at least two freewheeling switches in communication with the at least two conduction switches to provide a path for current during non-conduction periods; and

a drive signal generator to generate drive signals each having a duty cycle of approximately 50%, the drive signals to control the at least two conduction switches; and

wherein the coupled inductor regulator is arranged in a 1:-1 configuration such that the second voltage is approximately equal to a negative of the input voltage;

wherein the 1:-1 configuration includes two flyback regulators each operating at approximately 50% duty cycle, each flyback regulator including;

a conduction switch in communication with a freewheeling switch and an inductor, the conduction switch to communicate current during a conduction period from the a high side of the source of input voltage through the inductor to a low side of the source of input voltage, the freewheeling switch to provide a conduction path during the non-conduction period for current flowing from the output through the inductor to the low side of the source of input voltage..

58. A vehicle electrical system for powering a vehicle having first voltage and second voltage loads, comprising:

a battery to supply first voltage power to the first voltage loads of the vehicle; and

a coupled inductor regulator to generate on an output a second voltage power from the first voltage power, the second voltage power to power the second voltage loads.

59. The vehicle electrical system of Claim 58 wherein the first voltage power is approximately 24 volts, the second voltage power is approximately 12 volts, the first voltage

loads are 24 volt loads, and the second voltage loads are 12 volt loads.

60. The vehicle electrical system of Claim 59 wherein the 12 volt loads are selected from a group consisting of stereos, computers, cigarette chargers, global positioning systems, cell phone power units, and combinations thereof.

61. The vehicle electrical system of Claim 58 wherein the coupled inductor regulator comprises;

at least two conduction switches to conduct energy from the first voltage power to the output of the coupled inductor regulator;

at least two inductors in communication with the at least two conduction switches, the at least two inductors wound together on a common core and each inductor having a polarity such that DC currents in the inductors cancel each other, the inductors having a coefficient of coupling approximately equal to one;

at least two freewheeling switches in communication with the at least two conduction switches to provide a path for current during non-conduction periods; and

a drive signal generator to generate drive signals each having a duty cycle of approximately 50%, the drive signals to control the at least two conduction switches; and

wherein the coupled inductor regulator is arranged in a buck configuration, the buck configuration including two buck regulators each operating at approximately 50% duty cycle, each buck regulator including;

a conduction switch in communication with a freewheeling switch and an inductor, the conduction switch to communicate current during a conduction period from the first voltage power through the inductor to the output of the coupled inductor regulator, the freewheeling switch to provide a conduction path during the non-conduction period for current flowing through the inductor to the output of the coupled inductor regulator.

62. A driver power system for supplying power to a high speed line driver assembly, comprising:

a first power supply having an output to supply a first voltage to the driver assembly; and

a coupled inductor regulator to generate on an output a second voltage from the first voltage and to supply the second voltage to the driver assembly, the second voltage being approximately one-half of the first voltage.

63. The driver power supply of Claim 62 further comprising a filter connected to the second voltage to communicate a filtered reference voltage to the driver assembly.

64. The driver power supply of Claim 62 wherein the coupled inductor regulator comprises;

at least two conduction switches to conduct energy from the first power supply to the output of the coupled inductor regulator;

at least two inductors in communication with the at least two conduction switches, the at least two inductors wound together on a common core and each inductor having a polarity such that DC currents in the inductors cancel each other, the inductors having a coefficient of coupling approximately equal to one;

at least two freewheeling switches in communication with the at least two conduction switches to provide a path for current during non-conduction periods; and

a drive signal generator to generate drive signals each having a duty cycle of approximately 50%, the drive signals to control the at least two conduction switches; and

wherein the coupled inductor regulator is arranged in a buck configuration such that the second voltage is approximately equal to one-half of the first voltage, the buck configuration including two buck regulators each operating at approximately 50% duty cycle, each buck regulator including;

a conduction switch in communication with a freewheeling switch and an inductor, the conduction switch to communicate current during a conduction period from the first power supply through the inductor to the output of the coupled inductor regulator, the freewheeling switch to provide a conduction path during the non-conduction period for current flowing through the inductor to the output of the coupled inductor regulator.

65. A regulator system to convert energy from a source of input voltage to an output having an output voltage, comprising:

a first coupled inductor regulator to generate an intermediate voltage from the input voltage;

a buck converter to generate the output voltage from the intermediate voltage;

a feedback signal to sense the output voltage of the buck converter; and

the buck converter, responsive to the feedback signal, to control the output voltage.

66. The regulator system of Claim 65 fabricated on a single integrated circuit.

67. The regulator system of Claim 65 further comprising a multi-loop control system having a feedforward signal from the intermediate voltage to the buck converter.

68. The regulator system of Claim 67 wherein the multi-loop control system includes a circuit to weight the feedback and feedforward signals from the output voltage and the intermediate voltage to control the output voltage.

69. The regulator system of Claim 65 wherein the first coupled inductor regulator comprises;

at least two conduction switches to conduct energy from the source of input voltage to the output;

at least two inductors in communication with the at least two conduction switches, the at least two inductors wound together on a common core and each inductor having a polarity such that DC currents in the inductors cancel each other, the

inductors having a coefficient of coupling approximately equal to one;

at least two freewheeling switches in communication with the at least two conduction switches to provide a path for current during non-conduction periods; and

a drive signal generator to generate drive signals each having a duty cycle of approximately 50%, the drive signals to control the at least two conduction switches.

70. The regulator system of Claim 69 wherein the first coupled inductor regulator is arranged in a buck configuration such that the output voltage is approximately equal to one-half of the intermediate voltage.

71. The regulator system of Claim 70 wherein the buck configuration includes two buck regulators each operating at approximately 50% duty cycle, each buck regulator including;

a conduction switch in communication with a freewheeling switch and an inductor, the conduction switch to communicate current during a conduction period from the source of input voltage through the inductor to the output, the freewheeling switch to provide a conduction path during the non-conduction period for current flowing through the inductor to the output.

72. The regulator system of Claim 69 further comprising a second coupled inductor regulator connected between the buck converter and the first coupled inductor regulator.

73. The regulator system of Claim 72 wherein each of the first and second coupled inductor regulators arranged in a buck configuration such that the intermediate voltage is approximately equal to one-fourth of the input voltage.

74. The regulator system of Claim 73 wherein the second coupled inductor regulator generates a secondary voltage.

75. A coupled inductor regulator for converting energy from a source of input voltage to an output having an output voltage, comprising:

at least two means for conduction switching to controllably conduct energy from the source of input voltage to the output;

at least two inductors in communication with the at least two means for conduction switching, the at least two inductors wound together on a common core and each inductor having a polarity such that DC currents in the inductors cancel each other, the inductors having a coefficient of coupling approximately equal to one;

at least two means for freewheeling switching in communication with the at least two conduction switching means to provide a path for current during non-conduction periods; and

means for generating drive signals, the drive signals each having a duty cycle of approximately 50%, and the drive signals to control the at least two conduction switching means.

76. The coupled inductor regulator of Claim 75 wherein the coefficient of coupling is approximately at least 0.99.

77. The coupled inductor regulator of Claim 75 wherein the at least two conduction switching means, the at least two inductors, and the at least two freewheeling switching means are connected in a buck configuration such that the output voltage is approximately one-half the amplitude of the input voltage.

78. The coupled inductor regulator of Claim 3 wherein the buck configuration includes two buck regulators each operating at approximately 50% duty cycle, each buck regulator including;

a means for conduction switching in communication with a means for freewheeling switching and an inductor, the conduction switching means to communicate current during a conduction period from the source of input voltage through the inductor to the output, the freewheeling switching means to provide a conduction path during the non-conduction period for current flowing through the inductor to the output.

79. The coupled inductor regulator of Claim 75 wherein the at least two means for conduction switching, the at least two inductors, and the at least two means for freewheeling switching are connected in a boost configuration such that the output voltage is approximately twice the amplitude of the input voltage.

80. The coupled inductor regulator of Claim 79 wherein the boost configuration includes two boost regulators each operating at approximately 50% duty cycle, each boost regulator including;

a means for conduction switching in communication with a means for freewheeling switching and an inductor, the means for conduction switching ta communicate current during a conduction period from the a high side of the source of input voltage through the inductor to a low side of the source of

input voltage, the means for freewheeling switching to provide a conduction path during the non-conduction period for current flowing from the high side of the source of input voltage through the inductor to the output.

81. The coupled inductor regulator of Claim 75 wherein the at least two means for conduction switching, the at least two inductors, and the at least two means for freewheeling switching are connected in a 1:-1 configuration such that the output voltage is approximately a negative of the input voltage.

82. The coupled inductor regulator of Claim 81 wherein the 1:-1 configuration includes two flyback regulators each operating at approximately 50% duty cycle, each flyback regulator including;

a means for conduction switching in communication with a means for freewheeling switching and an inductor, the means for conduction switching to communicate current during a conduction period from the a high side of the source of input voltage through the inductor to a low side of the source of input voltage, the means for freewheeling switching to provide a conduction path during the non-conduction period for current

flowing from the output through the inductor to the low side of the source of input voltage.

83. The coupled inductor regulator of Claim 75 wherein at least one of the at least two means for conduction switching includes independently controllable parallel switches.

84. The coupled inductor regulator of Claim 75 wherein the output voltage supplies power to a load; and

further comprising means for frequency generating to generate a clock signal having an operating frequency, the drive signals synchronous to the clock signal, and the operating frequency controllable in response to changes in the load.

85. The coupled inductor regulator of Claim 84 wherein the changes in the load include output current changes and output voltage changes.

86. The coupled inductor regulator of Claim 75 wherein each of the at least two inductors includes a pair of series inductors, each pair having a common node between the series inductors; and

each of the at least two means for conduction switching in communication with the common node of a corresponding pair of series inductors.

87. The coupled inductor regulator of Claim 86 wherein the at least two means for conduction switching, pairs of series inductors, and the at least two means for freewheeling switching are connected in a buck configuration, the buck configuration including two buck regulators each operating at approximately 50% duty cycle, each buck regulator including;

a means for conduction switching in communication with a means for freewheeling switching and the pair of series inductors, the means for conduction switching to communicate current during a conduction period from the source of input voltage through the pair of series inductors to the output, the means for freewheeling switching to provide a conduction path during the non-conduction period for current flowing through one of the series inductors to the output.

88. The coupled inductor regulator of Claim 86 wherein the at least two means for conduction switching, the at least two inductors, and the at least two means for freewheeling switching are connected in a boost configuration including two

boost regulators each operating at approximately 50% duty cycle, each boost regulator including;

a means for conduction switching in communication with a means for freewheeling switching and an inductor, the means for conduction switching to communicate current during a conduction period from the a high side of the source of input voltage through the inductor to a low side of the source of input voltage, the means for freewheeling switching to provide a conduction path during the non-conduction period for current flowing from the high side of the source of input voltage through the inductor to the output.

89. The coupled inductor regulator of Claim 86 wherein the at least two means for conduction switching, the at least two inductors, and the at least two means for freewheeling switching are connected in a flyback configuration including two flyback regulators each operating at approximately 50% duty cycle, each flyback regulator including;

a means for conduction switching in communication with a means for freewheeling switching and an inductor, the means for conduction switching to communicate current during a conduction period from the a high side of the source of input voltage through the inductor to a low side of the source of input voltage, the means for freewheeling switching to provide

a conduction path during the non-conduction period for current flowing from the output through the inductor to the low side of the source of input voltage.

90. The coupled inductor regulator of Claim 86 wherein each of the at least two inductors has a quantity of turns, and a turns ratio of the turns for each pair of series inductors is selected to set a voltage ratio of the output voltage divided by the input voltage.

91. The coupled inductor regulator of Claim 90 wherein the at least two inductors each have approximately an equal quantity of turns such that the output voltage is approximately equal to one-fourth of the input voltage; and

wherein the at least two means for conduction switching, pairs of two series inductors, and the at least two means for freewheeling switching are connected in a buck configuration, the buck configuration including two buck regulators each operating at approximately 50% duty cycle, each buck regulator including;

a means for conduction switching in communication with a means for freewheeling switching and a pair of series inductors, the means for conduction switching to communicate current during a conduction period from the source of input

voltage through the pair of series inductor to the output, the means for freewheeling switching to provide a conduction path during the non-conduction period for current flowing through one of the series inductors to the output.

92. The coupled inductor regulator of Claim 90 wherein the series inductors include a first inductor in communication with one of the at least two means for conduction switching and a second inductor in communication with the output;

the turns ratio of the series inductors is defined as a quantity of turns of the first inductor divided by a quantity of turns of the second inductor; and

wherein the turns ratio of the series inductors is approximately equal to one-half such that the voltage ratio is approximately one-third.

93. The coupled inductor regulator of Claim 75 wherein the at least two means for freewheeling switching include synchronous rectifiers.

94. The coupled inductor regulator of Claim 75 wherein the drive signals include multi-level switching to reduce switching losses.

95. The coupled inductor regulator of Claim 75 included in a power system, the power system including means for low dropout regulating having a first output, the first output being the input voltage to the coupled inductor regulator; and

a feedback signal connected from the output voltage of the coupled inductor regulator to the means for low dropout regulating, the means for low dropout regulating to regulate the first output in response to the feedback signal.

96. The coupled inductor regulator of Claim 75 wherein the common core is made from a high permeability material.

97. The coupled inductor regulator of Claim 96 wherein the common core is made from a ferrite.

98. A regulator system for converting energy from a source of input voltage to an output having an output voltage, comprising:

means for low dropout regulating to generate an intermediate voltage from the input voltage;

means for coupled inductor regulating to generate the output voltage from the intermediate voltage; and

the means for low dropout regulating, responsive to a feedback signal from the output voltage, to regulate the

intermediate voltage such that the output voltage is regulated at a predetermined level.

99. The regulator system of Claim 98 wherein the means for low dropout regulating includes means for comparing to compare the feedback signal to a reference voltage; and

a Field Effect Transistor (FET), responsive to the means for comparing, to regulate the intermediate voltage.

100. The regulator system of Claim 98 fabricated on a single integrated circuit.

101. The regulator system of Claim 98 further comprising a multi-loop control system having at least another feedback signal from the intermediate voltage to the means for low dropout regulating.

102. The regulator system of Claim 101 wherein the multi-loop control system includes a circuit to weight the feedback signals from the output voltage and the intermediate voltage to control the output voltage.

103. The regulator system of Claim 101 wherein the multi-loop control system includes a circuit to select one of the

feedback signals from the output voltage and the intermediate voltage to control the output voltage.

104. The regulator system of Claim 101 wherein the multi-loop control system includes a slow inner loop to control the intermediate voltage and a fast outer loop to control the output voltage.

105. The regulator system of Claim 98 wherein the coupled inductor regulator comprises;

at least two means for conduction switching to conduct energy from the source of input voltage to the output;

at least two inductors in communication with the at least two means for conduction switching, the at least two inductors wound together on a common core and each inductor having a polarity such that DC currents in the inductors cancel each other, the inductors having a coefficient of coupling approximately equal to one;

at least two means for freewheeling switching in communication with the at least two means for conduction switching to provide a path for current during non-conduction periods; and

means for generating drive signals to generate drive signals each having a duty cycle of approximately 50%, the

drive signals to control the at least two means for conduction switching.

106. The regulator system of Claim 105 wherein the at least two means for conduction switching, inductors, and at least two means for freewheeling switching are connected in a buck configuration such that the output voltage is approximately one-half the amplitude of the input voltage.

107. The regulator system of Claim 106 wherein the buck configuration includes two buck regulators each operating at approximately 50% duty cycle, each buck regulator including;

a means for conduction switching in communication with a means for freewheeling switching and an inductor, the means for conduction switching to communicate current during a conduction period from the source of input voltage through the inductor to the output, the means for freewheeling switching to provide a conduction path during the non-conduction period for current flowing through the inductor to the output.

108. A multistage regulator system to convert energy from a source of input voltage to an output having an output voltage, comprising:

first means for coupled inductor regulating to generate an intermediate voltage from the input voltage, the first means for coupled inductor regulating having a first feature size;

second means for coupled inductor regulating to generate the output voltage from the intermediate voltage, the second means for coupled inductor regulating having a second feature size; and

the first feature size not equal to the second feature size.

109. The multistage regulator system of Claim 108 wherein each of the first and second means for coupled inductor regulating is arranged in a buck configuration.

110. The multistage regulator system of Claim 109 wherein the first feature size is greater than the second feature size.

111. The multistage regulator system of Claim 109 wherein the first feature size is approximately equal to the second feature size.

112. The multistage regulator system of Claim 108 wherein each of the first and second means for coupled inductor regulating comprises;

at least two means for conduction switching to conduct energy from the source of input voltage to the output;

at least two inductors in communication with the at least two means for conduction switching, the at least two inductors wound together on a common core and each inductor having a polarity such that DC currents in the inductors cancel each other, the inductors having a coefficient of coupling approximately equal to one;

at least two means for freewheeling switching in communication with the at least two means for conduction switching to provide a path for current during non-conduction periods; and

means for generating drive signals to generate drive signals each having a duty cycle of approximately 50%, the drive signals to control the at least two means for conduction switching.

113. The multistage regulator system of Claim 112 wherein each of the first and second means for coupled inductor regulating are connected in a buck configuration such that the output voltage of each of the first and second means for

coupled inductor regulating is approximately one-half the amplitude of the input voltage of the corresponding one of the means for coupled inductor regulating; and

wherein the buck configuration for each of the means for coupled inductor regulating includes two buck regulators each operating at approximately 50% duty cycle, each buck regulator including;

a means for conduction switching in communication with a means for freewheeling switching and an inductor, the means for conduction switching to communicate current during a conduction period from the source of input voltage through the inductor to the output, the means for freewheeling switching to provide a conduction path during the non-conduction period for current flowing through the inductor to the output.

114. A regulator system to convert energy from a source of input voltage to an output having an output voltage, comprising:

means for buck converting to generate an intermediate voltage from the input voltage;

first means for coupled inductor regulating to generate the output voltage from the intermediate voltage;

a feedback signal to sense the output voltage of the first means for coupled inductor regulating; and

the means for buck converting, responsive to the feedback signal, to control the intermediate voltage such that the output voltage of the first means for coupled inductor regulating is regulated.

115. The regulator system of Claim 114 fabricated on a single integrated circuit.

116. The regulator system of Claim 114 further comprising a multi-loop control system having at least another feedback signal from the intermediate voltage to the means for buck converting.

117. The regulator system of Claim 116 wherein the multi-loop control system includes a circuit to weight the feedback signals from the output voltage and the intermediate voltage to control the output voltage.

118. The regulator system of Claim 116 wherein the multi-loop control system includes a circuit to select one of the feedback signals from the output voltage and the intermediate voltage to control the output voltage.

119. The regulator system of Claim 116 wherein the multi-loop control system includes a slow inner loop to control the intermediate voltage and a fast outer loop to control the output voltage.

120. The regulator system of Claim 114 wherein the first means for coupled inductor regulating comprises;

at least two means for conduction switching to conduct energy from the source of input voltage to the output;

at least two inductors in communication with the at least two means for conduction switching, the at least two inductors wound together on a common core and each inductor having a polarity such that DC currents in the inductors cancel each other, the inductors having a coefficient of coupling approximately equal to one;

at least two means for freewheeling switching in communication with the at least two means for conduction switching to provide a path for current during non-conduction periods; and

means for generating drive signals to generate drive signals each having a duty cycle of approximately 50%, the drive signals to control the at least two means for conduction switching.

121. The regulator system of Claim 120 wherein the first means for coupled inductor regulating is arranged in a buck configuration such that the output voltage is approximately equal to one-half of the intermediate voltage.

122. The regulator system of Claim 121 wherein the buck configuration includes two buck regulators each operating at approximately 50% duty cycle, each buck regulator including;

a means for conduction switching in communication with a means for freewheeling switching and an inductor, the means for conduction switching to communicate current during a conduction period from the source of input voltage through the inductor to the output, the means for freewheeling switching to provide a conduction path during the non-conduction period for current flowing through the inductor to the output.

123. The regulator system of Claim 120 further comprising second means for coupled inductor regulating connected to the means for buck converting.

124. The regulator system of Claim 123 wherein the second means for coupled inductor regulating is connected in series between the means for buck converting and the first means for coupled inductor regulating, each of the first and second

means for coupled inductor regulating arranged in a buck configuration such that the output voltage is approximately equal to one-fourth of the intermediate voltage.

125. The regulator system of Claim 123 wherein the second means for coupled inductor regulating generates a secondary voltage from the intermediate voltage.

126. An amplifier system for generating an amplified signal, comprising:

means for amplifying referenced to ground to generate a single-ended signal from an input signal, the means for amplifying to receive power from an input voltage; and

means for coupled inductor regulating to generate a second voltage from the input voltage, the second voltage to be combined with the single-ended signal to form the amplified signal having approximately no DC bias.

127. The amplifier system of Claim 126 fabricated on a single integrated circuit.

128. The amplifier system of Claim 126 wherein the means for coupled inductor regulating comprises;

at least two means for conduction switching to conduct energy from the source of input voltage to the output;

at least two inductors in communication with the at least two means for conduction switching, the at least two inductors wound together on a common core and each inductor having a polarity such that DC currents in the inductors cancel each other, the inductors having a coefficient of coupling approximately equal to one;

at least two means for freewheeling switching in communication with the at least two means for conduction switching to provide a path for current during non-conduction periods; and

means for generating drive signals to generate drive signals each having a duty cycle of approximately 50%, the drive signals to control the at least two means for conduction switching; and

wherein the means for coupled inductor regulating is arranged in a buck configuration such that the second voltage is approximately equal to one-half of the input voltage;

wherein the buck configuration includes two buck regulators each operating at approximately 50% duty cycle, each buck regulator including;

a means for conduction switching in communication with a means for freewheeling switching and an inductor, the means

for conduction switching to communicate current during a conduction period from the source of input voltage through the inductor to the output, the means for freewheeling switching to provide a conduction path during the non-conduction period for current flowing through the inductor to the output.

129. An amplifier system for generating an amplified signal, comprising:

means for amplifying to generate the amplified signal from an input signal, the means for amplifying to receive power from an input voltage; and

means for coupled inductor regulating to generate a second voltage from the input voltage, the second voltage being a negative of the input voltage and in communication with the means for amplifying as a second power source so that DC bias in the amplified signal is reduced.

130. The amplifier system of Claim 129 fabricated on a single integrated circuit.

131. The amplifier system of Claim 129 wherein the means for coupled inductor regulating comprises;

at least two means for conduction switching to conduct energy from the source of input voltage to the output;

at least two inductors in communication with the at least two means for conduction switching, the at least two inductors wound together on a common core and each inductor having a polarity such that DC currents in the inductors cancel each other, the inductors having a coefficient of coupling approximately equal to one;

at least two means for freewheeling switching in communication with the at least two means for conduction switching to provide a path for current during non-conduction periods; and

a drive signal generator to generate drive signals each having a duty cycle of approximately 50%, the drive signals to control the at least two means for conduction switching; and

wherein the coupled inductor regulator is arranged in a 1:-1 configuration such that the second voltage is approximately equal to a negative of the input voltage;

wherein the 1:-1 configuration includes two flyback regulators each operating at approximately 50% duty cycle, each flyback regulator including;

a means for conduction switching in communication with a means for freewheeling switching and an inductor, the means for conduction switching to communicate current during a conduction period from the a high side of the source of input voltage through the inductor to a low side of the source of

input voltage, the means for freewheeling switching to provide a conduction path during the non-conduction period for current flowing from the output through the inductor to the low side of the source of input voltage..

132. A vehicle electrical system for powering a vehicle having first voltage and second voltage loads, comprising:

means for energy sourcing to supply first voltage power to the first voltage loads of the vehicle; and

means for coupled inductor regulating to generate on an output a second voltage power from the first voltage power, the second voltage power to power the second voltage loads.

133. The vehicle electrical system of Claim 132 wherein the first voltage power is approximately 24 volts, the second voltage power is approximately 12 volts, the first voltage loads are 24 volt loads, and the second voltage loads are 12 volt loads.

134. The vehicle electrical system of Claim 133 wherein the 12 volt loads are selected from a group consisting of stereos, computers, cigarette chargers, global positioning systems, cell phone power units, and combinations thereof.

135. The vehicle electrical system of Claim 132 wherein the means for coupled inductor regulating comprises;

at least two means for conduction switching to conduct energy from the first voltage power to the output of the means for coupled inductor regulating;

at least two inductors in communication with the at least two means for conduction switching, the at least two inductors wound together on a common core and each inductor having a polarity such that DC currents in the inductors cancel each other, the inductors having a coefficient of coupling approximately equal to one;

at least two means for freewheeling switching in communication with the at least two means for conduction switching to provide a path for current during non-conduction periods; and

means for generating drive signals to generate drive signals each having a duty cycle of approximately 50%, the drive signals to control the at least two means for conduction switching; and

wherein the means for coupled inductor regulating is arranged in a buck configuration, the buck configuration including two buck regulators each operating at approximately 50% duty cycle, each buck regulator including;

a means for conduction switchng in communication with a means for freewheeling switching and an inductor, the means for conduction switching to communicate current during a conduction period from the first voltage power through the inductor to the output of the coupled inductor regulator, the means for freewheeling switching to provide a conduction path during the non-conduction period for current flowing through the inductor to the output of the coupled inductor regulator.

136. A driver power system for supplying power to a high speed line driver assembly, comprising:

first means for supplying power having an output to supply a first voltage to the driver assembly; and

means for coupled inductor regulating to generate on an output a second voltage from the first voltage and to supply the second voltage to the driver assembly, the second voltage being approximately one-half of the first voltage.

137. The driver power supply of Claim 136 further comprising means for filtering to receive the second voltage and to communicate a filtered reference voltage to the driver assembly.

138. The driver power supply of Claim 136 wherein the coupled inductor regulator comprises;

at least two means for conduction switching to conduct energy from the first means for supplying power to the output of the means for coupled inductor regulating;

at least two inductors in communication with the at least two means for conduction switching, the at least two inductors wound together on a common core and each inductor having a polarity such that DC currents in the inductors cancel each other, the inductors having a coefficient of coupling approximately equal to one;

at least two means for freewheeling switching in communication with the at least two means for conduction switching to provide a path for current during non-conduction periods; and

means for generating drive signals to generate drive signals each having a duty cycle of approximately 50%, the drive signals to control the at least two means for conduction switching; and

wherein the means for coupled inductor regulating is arranged in a buck configuration such that the second voltage is approximately equal to one-half of the first voltage, the buck configuration including two buck regulators each

operating at approximately 50% duty cycle, each buck regulator including;

a means for conduction switching in communication with a means for freewheeling switching and an inductor, the means for conduction switching to communicate current during a conduction period from the first power supply through the inductor to the output of the coupled inductor regulator, the means for freewheeling switching to provide a conduction path during the non-conduction period for current flowing through the inductor to the output of the coupled inductor regulator.

139. A regulator system to convert energy from a source of input voltage to an output having an output voltage, comprising:

first means for coupled inductor regulating to generate an intermediate voltage from the input voltage;

means for buck converting to generate the output voltage from the intermediate voltage;

a feedback signal to sense the output voltage of the means for buck converting; and

the means for buck converting, responsive to the feedback signal, to control the output voltage.

140. The regulator system of Claim 139 fabricated on a single integrated circuit.

141. The regulator system of Claim 139 further comprising a multi-loop control system having a feedforward signal from the intermediate voltage to the means for buck converting.

142. The regulator system of Claim 141 wherein the multi-loop control system includes a circuit to weight the feedback and feedforward signals from the output voltage and the intermediate voltage to control the output voltage.

143. The regulator system of Claim 139 wherein the first means for coupled inductor regulating comprises;

at least two means for conduction switching to conduct energy from the source of input voltage to the output;

at least two inductors in communication with the at least two means for conduction switching, the at least two inductors wound together on a common core and each inductor having a polarity such that DC currents in the inductors cancel each other, the inductors having a coefficient of coupling approximately equal to one;

at least two means for freewheeling switching in communication with the at least two means for conduction

switching to provide a path for current during non-conduction periods; and

means for generating drive signals to generate drive signals each having a duty cycle of approximately 50%, the drive signals to control the at least two means for conduction switching.

144. The regulator system of Claim 143 wherein the first means for coupled inductor regulating is arranged in a buck configuration such that the output voltage is approximately equal to one-half of the intermediate voltage.

145. The regulator system of Claim 144 wherein the buck configuration includes two buck regulators each operating at approximately 50% duty cycle, each buck regulator including;

a means for conduction switching in communication with a means for freewheeling switching and an inductor, the means for conduction switching to communicate current during a conduction period from the source of input voltage through the inductor to the output, the means for freewheeling switching to provide a conduction path during the non-conduction period for current flowing through the inductor to the output.

146. The regulator system of Claim 143 further comprising second means for coupled inductor regulating connected between the means for buck converting and the first means for coupled inductor regulating.

147. The regulator system of Claim 146 wherein each of the first and second means for coupled inductor regulating are arranged in a buck configuration such that the intermediate voltage is approximately equal to one-fourth of the input voltage.

148. The regulator system of Claim 147 wherein the second means for coupled inductor regulating generates a secondary voltage.

149. The vehicle electrical system of Claim 58 wherein the battery has a voltage amplitude; and

further comprising an autosensor to control the coupled inductor regulator as a function of the voltage amplitude of the battery.

150. The vehicle electrical system of Claim 149 wherein if the voltage amplitude of the battery is approximately greater than a predetermined voltage, the autosensor to

control the coupled inductor regulator to generate the second voltage power having a voltage level that is approximately equal to one-half of the voltage level of the battery.

151. The vehicle electrical system of Claim 150 wherein if the voltage amplitude of the battery is approximately less than the predetermined voltage, the autosensor to control the coupled inductor regulator to generate the second voltage power having a voltage level that is approximately equal to the voltage level of the battery.

152. The vehicle electrical system of Claim 132 wherein the means for energy sourcing has a voltage amplitude; and

further comprising means for autosensing to control the means for coupled inductor regulating as a function of the voltage amplitude of the means for energy sourcing.

153. The vehicle electrical system of Claim 152 wherein if the voltage amplitude of the means for energy sourcing is approximately greater than a predetermined voltage, the means for autosensing to control the means for coupled inductor regulating to generate the second voltage power having a voltage level that is approximately equal to one-half of the voltage level of the means for energy sourcing.

154. The vehicle electrical system of Claim 153 wherein if the voltage amplitude of the means for energy sourcing is approximately less than the predetermined voltage, the means for autosensing to control the means for coupled inductor regulating to generate the second voltage power having a voltage level that is approximately equal to the voltage level of the means for energy sourcing.

155. A coupled inductor regulator for converting energy from a source of input voltage to an output having an output voltage, comprising:

at least two phase signals to control a conduction time;

at least two drivers, responsive to the at least two phase signals, to conduct energy from the source of input voltage;

a lattice network of coupled inductors in communication between the at least two drivers and the output, the lattice network having N stages wherein N is at least one, pairs of inductors within each of the stages each having a coefficient of coupling approximately equal to one;

the phase signals each having a duty cycle of approximately 100%/2N; and

the output voltage approximately equal to the input voltage divided by 2N.

156. The coupled inductor regulator of Claim 155 wherein the at least two phase signals have a quantity approximately equal to 2N.

157. The coupled inductor regulator of Claim 155 wherein the at least two drivers have a quantity approximately equal to 2N.

158. The coupled inductor regulator of Claim 155 wherein the pairs of inductors of a stage of the lattice network are in communication with an inductor of a previous stage of the lattice network such that each stage of the lattice network has twice as many inductors as the previous stage.

159. The coupled inductor regulator of Claim 155 wherein the pairs of inductors are each wound on corresponding single magnetic core structures.

160. The coupled inductor regulator of Claim 155 wherein N is equal to two and the output voltage is approximately equal to one-fourth of the input voltage.

161. The coupled inductor regulator of Claim 160 wherein the pairs of inductors are each wound on corresponding single magnetic core structures.

162. The coupled inductor regulator of Claim 160 wherein the phase signals are arranged in a timing sequence selected from a group consisting of sequential and alternating.

163. The coupled inductor regulator of Claim 162 an intermediate frequency of the lattice network with the alternating timing sequence is greater than the intermediate frequency of the lattice network with the sequential timing sequence.

164. A coupled inductor regulator for converting energy from a source of input voltage to an output having an output voltage, comprising:

at least two phase signals to control a conduction time;

at least two means for conducting, responsive to the at least two phase signals, to conduct energy from the source of input voltage;

a lattice network of coupled inductors in communication between the at least two means for conducting and the output,

the lattice network having N stages wherein N is at least one, pairs of the coupled inductors within each of the stages each having a coefficient of coupling approximately equal to one;

the phase signals each having a duty cycle of approximately 100%/2N; and

the output voltage approximately equal to the input voltage divided by 2N.

165. The coupled inductor regulator of Claim 164 wherein the at least two phase signals have a quantity approximately equal to 2N.

166. The coupled inductor regulator of Claim 164 wherein the at least two means for conducting have a quantity approximately equal to 2N.

167. The coupled inductor regulator of Claim 164 wherein the pairs of inductors of a stage of the lattice network are in communication with an inductor of a previous stage of the lattice network such that each stage of the lattice network has twice as many inductors as the previous stage.

168. The coupled inductor regulator of Claim 164 wherein the pairs of inductors are each wound on corresponding single means for magnetic coupling.

169. The coupled inductor regulator of Claim 164 wherein N is equal to two and the output voltage is approximately equal to one-fourth of the input voltage.

170. The coupled inductor regulator of Claim 169 wherein the pairs of inductors are each wound on corresponding single means for magnetic coupling.

171. The coupled inductor regulator of Claim 169 wherein the phase signals are arranged in a timing sequence selected from a group consisting of sequential and alternating.

172. The coupled inductor regulator of Claim 171 an intermediate frequency of the lattice network with the alternating timing sequence is greater than the intermediate frequency of the lattice network with the sequential timing sequence.

173. An autosensing regulator for generating an output voltage from an input voltage regulator, comprising:

an autosensor to sense an amplitude of the input voltage; and

a voltage regulator, responsive to the autosensor, to generate the output voltage;

wherein if the input voltage is approximately greater than a reference voltage, the output voltage is approximately equal to one-half of the input voltage, and if the input voltage is not greater than the reference voltage, then the output voltage is approximately equal to the input voltage.

174. The autosensing regulator of Claim 173 wherein the voltage regulator is a coupled inductor regulator comprising;

at least two conduction switches to conduct energy from the source of input voltage to the output;

at least two inductors in communication with the at least two conduction switches, the at least two inductors wound together on a common core and each inductor having a polarity such that DC currents in the inductors cancel each other, the inductors having a coefficient of coupling approximately equal to one;

at least two freewheeling switches in communication with the at least two conduction switches to provide a path for current during non-conduction periods; and

a drive signal generator to generate drive signals each having a duty cycle of approximately 50%, the drive signals to control the at least two conduction switches.

175. The autosensing regulator of Claim 174 wherein the at least two conduction switches, the at least two inductors, and the at least two freewheeling switches are connected in a buck configuration.

176. The autosensing regulator of Claim 175 wherein the buck configuration includes two buck regulators each operating at approximately 50% duty cycle, each buck regulator including;

a conduction switch in communication with a freewheeling switch and an inductor, the conduction switch to communicate current during a conduction period from the source of input voltage through the inductor to the output, the freewheeling switch to provide a conduction path during the non-conduction period for current flowing through the inductor to the output.

177. The autosensing regulator of Claim 175 wherein the autosensor to control the at least two conduction switches of the coupled inductor regulator as a function of the amplitude of the input voltage.

178. The autosensing regulator of Claim 173 wherein the voltage regulator is a buck converter having a conduction switch.

179. The autosensing regulator of Claim 178 wherein the autosensor to control the conduction switch of the buck converter as a function of the amplitude of the input voltage.

180. An autosensing regulator for generating an output voltage from an input voltage regulator, comprising:

means for voltage sensing to sense an amplitude of the input voltage; and

means for voltage regulating, responsive to the means for voltage sensing, to generate the output voltage;

wherein if the input voltage is approximately greater than a reference voltage, the output voltage is approximately equal to one-half of the input voltage, and if the input voltage is not greater than the reference voltage, then the output voltage is approximately equal to the input voltage.

181. The autosensing regulator of Claim 180 wherein the means for voltage regulating is a coupled inductor regulator comprising;

at least two means for conduction switching to conduct energy from the source of input voltage to the output;

at least two inductors in communication with the at least two conduction switches, the at least two inductors wound together on a common core and each inductor having a polarity such that DC currents in the inductors cancel each other, the inductors having a coefficient of coupling approximately equal to one;

at least two means for freewheeling switching in communication with the at least two means for conduction switching to provide a path for current during non-conduction periods; and

means for drive signal generating to generate drive signals each having a duty cycle of approximately 50%, the drive signals to control the at least two means for conduction switching.

182. The autosensing regulator of Claim 181 wherein the at least two means for conduction switching, the at least two inductors, and the at least two means for freewheeling switching are connected in a buck configuration.

183. The autosensing regulator of Claim 182 wherein the buck configuration includes two buck regulators each operating

at approximately 50% duty cycle, each buck regulator including;

a means for conduction switching in communication with a means for freewheeling switching and an inductor, the means for conduction switching to communicate current during a conduction period from the source of input voltage through the inductor to the output, the means for freewheeling switching to provide a conduction path during the non-conduction period for current flowing through the inductor to the output.

184. The autosensing regulator of Claim 182 wherein the means for voltage sensing to control the at least two means for conduction switching of the coupled inductor regulator as a function of the amplitude of the input voltage.

185. The autosensing regulator of Claim 180 wherein the means for voltage regulating is a buck converter having a means for conduction switching.

186. The autosensing regulator of Claim 185 wherein the autosensor to control the means for conduction switching of the buck converter as a function of the amplitude of the input voltage.